



Introduction to DARPA

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Outline



- **DARPA's Role in a Changing World**
- **DARPA Strategy, Organization, Operation, Focus Areas**

Today's Changing World



**In order to survive in the future,
institutions must organize for:**

**Peter Drucker,
Forbes, Oct. 5,
1998**

**Systematic, continuing
improvement**



DoD Analogue

**Training and
experimentation**



**Sustaining,
requirements-based
R&D**



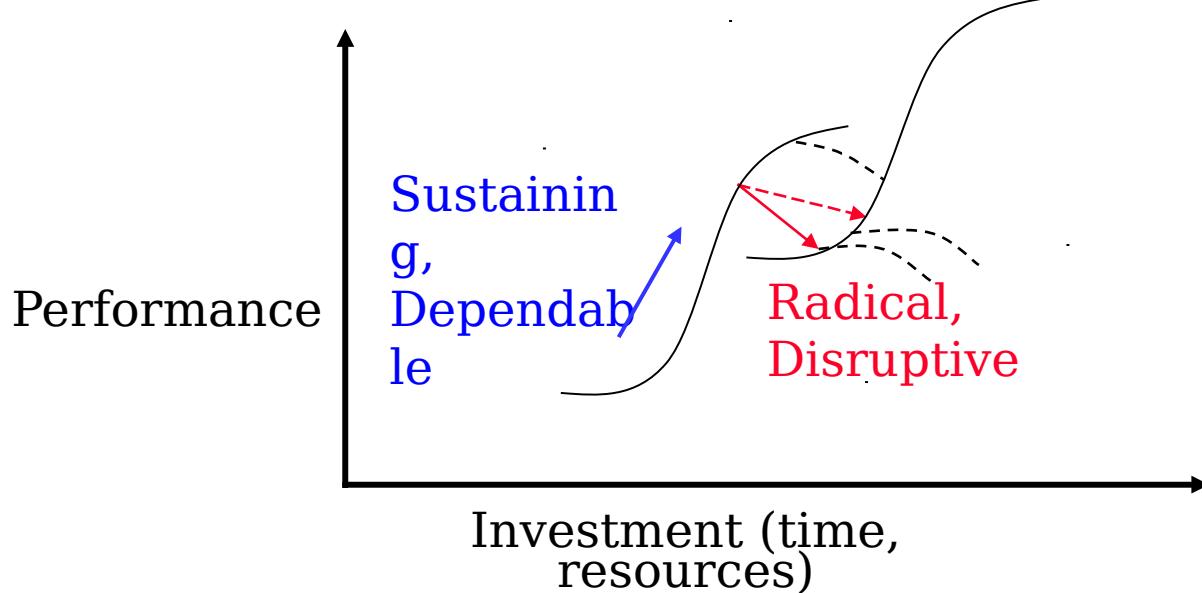
**21st Century
restatement of DARPA
mission . . . *radical
innovation***

**Innovation with a goal
that makes obsolete and,
to a large extent, replaces
even the most successful
current products**

Innovation



Innovation is more than invention -- it represents a change in operations



- **Innovation takes a long time for large institutions**
- **Radical innovation is risky**
- **Radical innovation requires leadership, dedication, protection**

DARPA Mission



*Innovation in support of
National Security*

- **Solve National-level problems**
- **Enable Operational Dominance**
- **High Risk Technology Development, Exploitation --*Avoid Surprise***

DARPA's Approach



Strategy

- Flexibility, ability to quickly exploit emerging situations is the highest priority
- Emphasize high technical risk, high focus investments
- Emphasize competition for ideas, reward for quality performance
- An investment firm, not R&D lab, no established constituency
- Methodically search for and exploit externally generated ideas

Operations

- Flat, small organization, no long-term investments in facilities, themes
- Constant rotation of programs, program managers, directors
- Continuity provided by industry, other government agencies, customer
- Highly flexible contracting, hiring capabilities

DARPA is DoD's Enabler for Radical Innovation

- Broader horizon than commercial analogues
- More focused than university research

DARPA's Role



DARPA

Bottom-up, opportunity, event-driven

Great process flexibility

Integrated research

Radical change

Central DoD agency for R&D

Tolerant of high risk

Planned product obsolescence

SERVICE R&D

- ★ Top-down, requirement, schedule-driven
- ★ Highly formalized processes
- ★ 6.1 - 6.5 research separated
- ★ Reliable, sustainable gains
- ★ Support Service mission
- ★ Risk-averse
- ★ Planned product improvement

The DoD requires both radical innovation
and
requirements-based R&D

DARPA Priorities



- **Attract excellent people**
- **Foster environment to encourage fair competition among the best researchers, emphasize new players**
- **Establish methodical outreach process to look for and leverage new non-DoD technologies for national security**
- **Establish partnerships with CINCs and Service leadership to implement iterative experimentation and analysis**

DARPA Investment Criteria



- **We constantly ask our Technical Directors/Program Managers:**
 - **What are you trying to accomplish?**
 - **How is it done now, and with what limitations?**
 - **What is truly new in your approach which will remove current limitations and improve performance? By how much?**
 - **If successful, what difference will it make?**
 - **What are the mid-term, final exams or full scale applications required to prove your hypothesis? When will they be done?**
 - **What is the DARPA “exit strategy”?**
 - **How much will it cost?**

Some Current Focus Areas



National Security

- Protection from Biological Attack
 - Reactive and proactive technical needs
- Protection from Information Attack

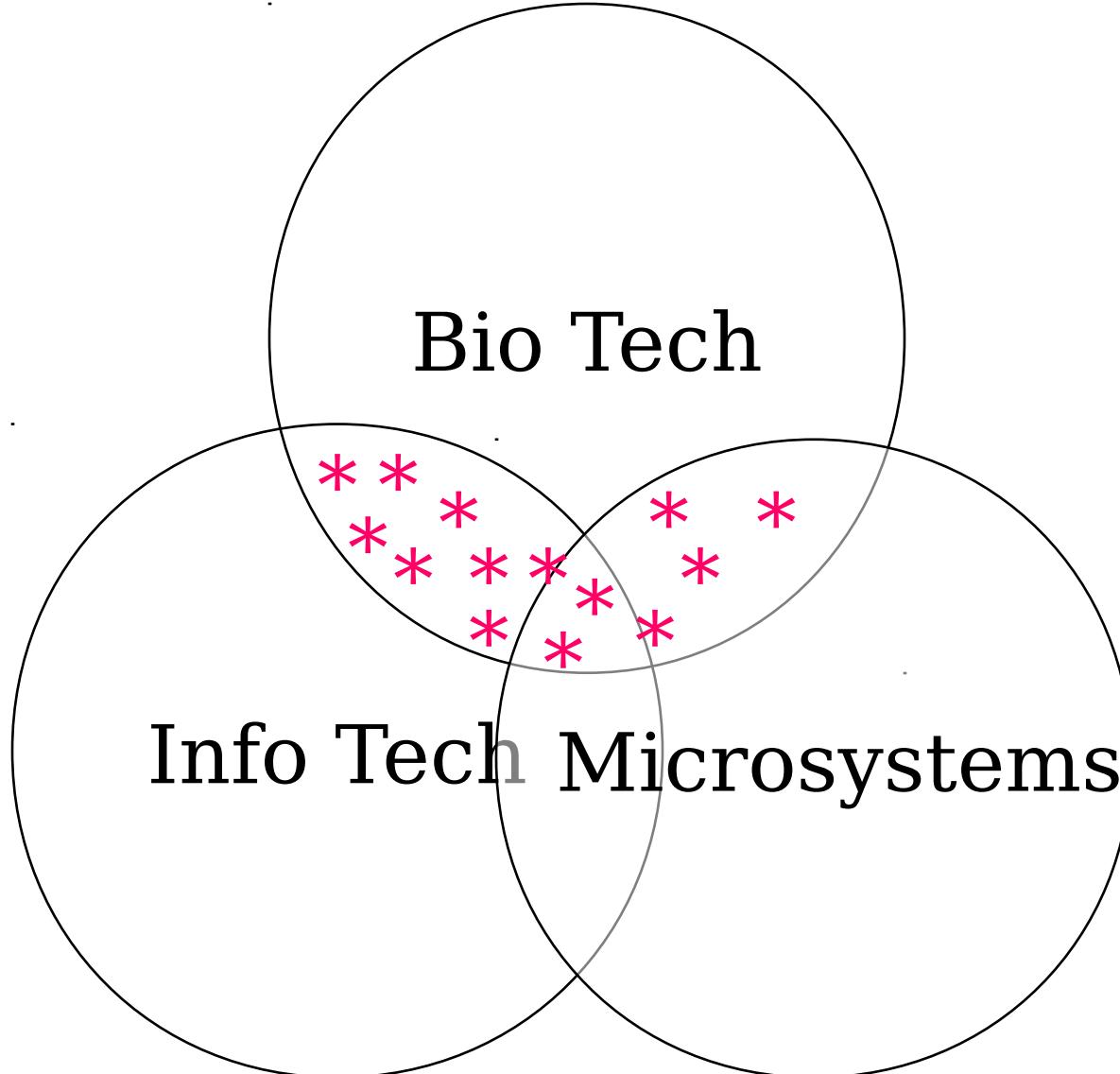
Operational Dominance

- Outcome-Based Preparation, Planning
- Affordable, Precision Moving Target Kill
 - Offensive and defensive
- Mobile, Distributed Communications
- Future Warfare Concepts

High-Risk Technology Exploitation

- Core Technologies
- The Intersection of Biology, Information and Microsystems

Exploring the Interface between Biological Technology and More Conventional DoD Technologies



DARPA Organization



Director
Frank Fernandez
Deputy Director
Jane Alexander

Advanced Technology

Tom Meyer
William Jeffrey

Early Entry, Rapid Reaction Forces, Special Forces

Communications
Maritime

Defense Sciences

Lawrence Dubois
Michael Goldblatt

Bio Warfare
Defense
Technologies

Biology
Materials &

Information Systems

William Mularie
Steven Carroll (Act'g)

Information Assurance & Security
Command & Control

Information Technology

Bert Hui (Act'g)

Networking
Embedded and Autonomous Computing
User Interfaces & Translation

Microsystems Technology

Noel MacDonald
Ellison Urban

Electronics
Optoelectronics
MEMS
Combined Microsystems

Special Projects

James Carlini
Amy Alving

Biological Warfare
Defense Systems
Affordable Precision Attack of Mobile Targets
Counter

Tactical Technology

David Whelan
Allen Adler

Air, Space, & Land Platforms
Future Army System
Precision Attack

Military Assistant

CAPT A. Myers, USN

Operational Liaisons

Col R. Kurjanowicz, USAF; LTC G. Sauer, USA